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Small Business: The Missing Link in U.S. Innovation Policy

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Contrasts between the economic condition and management strategies of American and Japanese businesses have been the focus of considerable attention recently. American managers are pressured into short-term profit maximization; their Japanese counterparts are permitted longer periods to succeed. Where American management-labor relations are divisive, the Japanese have made a science of harmonious relations between employers and employees. The major portion of the U.S. research budget is concentrated in the defense area; the Japanese concentrate primary research in technologies of commercial importance. There is a consensus that central planning has been integral to the Japanese success; the same cooperative planning would bring U.S. industry up against anti-trust regulation, a commentary on the traditionally adversary relationship between business and government.

Few would argue the appropriateness or likely effectiveness of a wholesale transference of the Japanese system to the American condition. But there is recognition that certain practices could and should find their U.S. application. Prominent among these would be Japan's full utilization of its small business community, which stands in sharp contrast to the U.S. experience.

From 1953 to 1973, about one in two major U.S. inventions were developed by small businesses and individual entrepreneurs, an achievement that is more remarkable considering that small business collectively received a minor proportion of federal R & D. (In 1979, of the $12.5 billion in federal funds going to private sector R & D, roughly $290 million went to firms with fewer than 1,000 employees — a mere 2.3 percent.)

A growing understanding of the talents and resourcefulness of small technology firms could go far to stem the tide of Japan's incursion into the U.S. technology lead. Recently, new wisdom has infiltrated Washington, leading to hopeful results. On July 22, President Reagan signed the Small Business Innovation Development Act, which funds with some $400 million in federal R & D appropriations a new, competitive grant program for innovative small firms. The $400 million amounts to 1.25 percent of the U.S. research budget, now totaling over $40 billion a year.

The relatively small-scale monetary commitment and overwhelming support in Congress for the bill belies the true intensity of debate which surrounded its passage, and currently impedes implementation. The senate's passage of its version of the bill by 90-0 last December received little dissent from special interest groups. Not so in the House, which started debate last January. First to mobilize was the education lobby, led by major medical research universities. Administrators at these universities protested that the legislation threatened to further deplete them of research and development funding and of the scientists and engineers who carry out that research.

Their opposition found ready support within the federal agencies affected by the legislation. The eleven agencies that must establish Small Business Innovation Research (SBIR) grants as a result of the Act include Defense, NASA, Energy, Health and Human Services, Agriculture, Transportation, Interior, EPA, Commerce, the National Regulatory Commission, and the National Science Foundation, which already has a successful SBIR program and didn't object to the new proposal.

Agency criticism centered on two points: reduction of discretionary funding, and the supposed lack of small companies qualified to fulfill such an ambitious program. Not publicly expressed as a concern by the bureaucrats, but all too engrained in their operating practice, was their desire to make the safest procurement for their agency.

A third, more surprising source of opposition came from the American Electronics Association (AEA), which ostensibly opposed the bill because of philosophical disagreements over set-asides of federal money. AEA's position was subsequently discredited because its membership was never polled on the issue, and the majority of its members are large companies with separate reasons for wanting the bill killed. Also, it had become clear that the legislation would generate tremendous competition among those who vie for the set-aside.

Each of these three opposing groups — research-oriented universities, federal agencies, and the AEA — has a long standing association with Congressional committees, particularly in the House. Vigorous appeals for support in torpedoing the bill showed up when seven House committees convened a brutal series of sequential hearings — a response unheard of in recent congressional history.

Milton D. Stewart, editor of *Inc.* magazine, called this alliance the "iron triangle." Stewart wrote in the September 1982 issue: "These generally unbeatable coalitions are made up of career bureaucrats in a federal agency, lobbyists with a stake in that agency, and the congressional committee members and staffs assigned to the agency."

The self-interests served by each of these groups seriously detracted from the overwhelming task. Proponents of this legislation lobbied not nearly as much for expanding the R & D allotment to small business as they did for a more balanced, better leveraged, more competitive innovation policy. Since the mid-1970's, blue ribbon private and public sector panels had been endorsing a more prominent role for small business in U.S. innovation policy. The act which ensued proved a natural extension of such endorsements.

Commonsense, not so common to Washington, has won this round, at least in the short term. The SBIR program is the first commitment of the federal government to recognizing the contribution that small business can make to a vigorous science and technology policy.

At the bill's signing, President Reagan answered the critics:

"As we meet here today, there's some fellow or gal in a research park or a garage inventing something that will make our future healthy or more productive or more comfortable. I believe the bill recognizes the contribution of small high technology firms to the nation's growth, productivity and competitiveness. . . . . .

"The Small Business Innovation Development Act recognizes that we in government must work in partnership with small business to ensure that technologies and processes are readily transferred to commercial applications," Reagan said.

However, Reagan aptly noted the immediate problem of implementing the bill. "Now we face," he went on, "the difficult task of implementing this program in several agencies of the government. Let me assure you of this administration's strong commitment to this program. We will direct the rest of the government to cooperate fully in speedily putting it into effect."

The prospect of agency noncompliance apparently had been brought to the President's attention. Sen. Warren Rudman (R-N.H.), the main Congressional champion of the bill, also cautioned recalcitrant agencies. Speaking September 10 at a seminar on how small firms can use the SBIR program, Rudman said that he would call special hearings this Fall if the affected agencies failed to institute viable SBIR programs.

According to the Small Business Administration (SBA), the agency which monitors implementation, SBIR solicitations should be issued by December or January. Some $30 to $50 million is expected to be awarded in FY 1982, with an anticipated level of $400 million a year when fully operational in 1986. Moreover, the law included a sunset provision to become effective by the end of 1986. Congress must deem the program successful by that date, or else it has the option of eliminating SBIR grants under the sunset provision.

In such a tight time frame, delay in implementation becomes critical. There is a long track record of bureaucratic recalcitrance effectively subverting the intent of Congress, thus ensuring that passed legislation does not get implemented. For bureaucrats with the skill and inclination, this legislation is easy prey.

When Sen. Rudman introduced the legislation in Congress in 1981, the uneven tilt in federal R & D toward university, government, and big business labs was well documented, as evidenced by the 2.3 percent of private sector R & D given by the government to small business.

Yet studies had shown that smaller businesses provide half the major U.S. inventions, and the NSF reported that small firms constitute 85 percent, or 20,000 to 30,000 firms, of all U.S. companies conducting R & D. Moreover, small firms produce two to three times as many innovations per employee as large firms, and 24 times as many major innovations per R & D dollar as large companies.

Small business proponents had argued — largely unsuccessfully — for a share of R & D that would make full use of entrepreneurial resources. Limited success did result in Congressional passage in 1975 of the SBIR program at the National Science Foundation, a result of a rider introduced by Senator Kennedy to an NSF appropriations bill.

The NSF program, remarkably productive by any standard, came to be perceived as the model for expanded legislation which would bring small business into the mainstream of U.S. innovation policy. The SBIR grant program satisfied many objectives, by:

—stimulating technological innovation;
—encouraging the participation of small science and high technology firms in government research;
—providing incentives for the conversion of research results into commercial application.

Proponents of the new legislation realized that, for broadened support, they had to meet not only the needs of small business, but the needs of the federal agencies that would administer the SBIR program. So a new phrase was added to the debate: the SBIR program would have to meet specific agency goals.

The method used to fulfill these goals proved to be atypical for federal R & D funding. Unlike other government R & D programs which normally define in very specific terms what agencies want to buy, this program's broad definition enables competing small companies to propose better ways of meeting agency objectives. If ever a program traded on entrepreneurial genius, this would be it.

Using the NSF program as a yardstick, the government-wide SBIR promises superlative returns on taxpayer dollars. Indeed, since its inception in 1977 at NSF, the SBIR has funded over 300 projects from more than 3,000 proposals submitted by small businesses. (The average grant winner employed 10 people.) To date, private funding of successful innovations is returning three times the $16 million that the federal government has invested. Firms participating in this program experienced employment growth of 125 percent as a result of the development and subsequent marketing of their ideas.

Under the provisions of the Act, SBIR will operate through a three-phase uniform process. In the first phase, agencies will award up to $50,000 for research projects to evaluate the technical and economic feasibility of an idea.

In the second phase, projects with the most potential will be funded one or two years for up to $500,000 for prototype development. Underscoring this level of funding is the requirement that a private sector commitment for follow-on funding will have been made. The third phase encourages private sector investment production contracts from federal research and development.

The SBA has taken seriously its role of SBIR overseer. The agency emphasizes its intention of promoting competition in the program, while keeping the paperwork and regulation minimal. Specifically, the SBA will issue a master schedule of solicitations and revisions from the participating agencies. This arrangement will give small businesses interested in bidding on certain projects sufficient time to apply. Additionally, SBA is developing a source file of interested and qualified small businesses.

Implications of Victory

Passage of this legislation far transcends the mere act of allotting a fractional sum of federal money for one specific purpose. It represents significant changes in direction, not the least of which is the inclusion of small business as a legitimate cog in U.S. innovation policy.

First, there is deep political meaning. Small Business has never been known as a heavyweight lobby, one which could slug it out with monied special interests. So when small business became embroiled in a fight of this magnitude, several events had to coincide.

The small business lobby, too often divided, had to stay together, and for a long period of time. Senators and Congressmen of endurance and prominence had to emerge, and establish themselves as undauntable small business advocates. Small business owners, not known for letter writing and leveraging congressional contacts, had to do both. And the White House and congressional leaders (particularly in the House, where Speaker O'Neill made it possible for the bill to get a fair hearing), had to support the small business position.

This does not mean that business will join the cadre of powerful lobbies that Congress and the Administration regularly consult before acting. Indeed, the flex of small business muscle has made numerous enemies for the entrepreneurial lobby. But small business has tasted its first significant success in Washington. Power in Washington gravitates to those who win, and small business, for the first time, has won big.

Second, there is a series of myths about small business and innovation that Congress has helped to dispel by passing the Act. As outlined by an SBA Task Force monitoring the Act, the myths further notions that small business won't or can't take innovation seriously.

MYTH 1: Small businesses don't innovate — they invent. The implication here is that innovative ideas are marketable whereas inventions may or may not be.

MYTH 2: When small businesses do innovate, they are capable of developing only trivial products, rarely associated with technological breakthroughs.

MYTH 3: Small businesses don't have the staying power to see a creative idea through all the stages of innovation if it requires considerable time and resources.

MYTH 4: All the really talented people work for large companies, universities, or the federal government.

The credibility of such myths has conspired to keep small business out of the R & D funding mainstream. Now, Congress is betting that it has been mistaken all these years.

Third, the White House, Congress, universities, and state governments have started to base science and technology policy on several theories and presumptions that differ from those previously entertained. Many think that the revolution in innovation doesn't require new money, but rather integrating technology with general economic policy.

Hard questions are asked: How do we ensure an ample flow of scientists and engineers from our colleges? How can the technology developed at the 700 government-controlled laboratories be transferred to commercial application? How should tax and patent policy be structured for maximum science and technology development? Where does government fit in the financing of long-term, risky research? How can the unemployed in heavy industry become workers in the growth industries of today and tomorrow?

Whatever the question, at least part of the answer lies in small business. The Small Business Innovation Development Act represents the auspicious beginning of a new trend. Americans will be sure to maintain their quality of life if it continues.

MSBDC Announces its Third Year of Funding

The University of Massachusetts, School of Business Administration is pleased to announce the third year of funding for the Massachusetts Small Business Development Center. The MSBDC is a statewide network of Centers providing management and technical assistance and education and training programs to the small business community of Massachusetts. All counseling services of the MSBDC are free of charge.

The MSBDC, which is funded by the U.S. Small Business Administration, the Massachusetts Department of Commerce, and by "in kind" contributions from its consortium members, will receive $1.227 million for its third program year. As the prime grantee for the program, the University of Massachusetts sponsors the Central Administrative Unit, the Capital Formation Service and the Western Massachusetts Regional Office. Other regional sponsors are Boston College, the University of Lowell, Southeastern Massachusetts University, Clark Univesity and Salem State College.

For further information contact the MSBDC at 413-549-4930 ext 303.

The U.S. Productivity Recession

Fantasies & Realities

Robert E. McGarrah

Almost every manager is aware of the national productivity crisis, and of generally accepted explanations for its causes. But many explanations are illusions. They obscure the real problem and delay efforts to find effective remedies to restore productivity growth.

Productivity is more than a statistic measuring output of goods or services per input of manpower or machine power. It indicates the ability of an organization to provide products and services of the right quality, availability and price for which people are willing to pay. Productivity growth is a requirement for the survival of business, governmental or nonprofit organizations. It reflects the public's support of institutions and their work processes.

Productivity stagnation indicates a decline in peoples trust, loyalty and commitment, and a rise in apathy, resignation, and perhaps resistance to work standards Ours is a technological and highly organized society. Our productivity measures the changes in our economic wellbeing and our political and military powers of security, vis-a-vis other nations.

With far less capital wealth, fewer natural resources, and fewer citizens with university-certified, professional qualifications, annual productivity growth in Japan has been seven per cent, in France and West Germany five per cent, compared with less than one per cent in the U.S. The amount of goods or services produced and distributed per unit of employee effort has been declining in the U.S. since 1965. This is a major reason why we suffer more from higher unemployment, interest rates and deficits in international trade than either West Germany or Japan.

In diagnosing causes of the U.S. productivity recession there has been confusion between fantasies and realities.

Fantasy: Government regulations divert resources needed for productivity growth.

Politicians, business executives and academics blame government regulations of health and safety, equal employment opportunity, energy and environmental protection for our productivity stagnation. They allege that compliance requires large expenditures that are nonproductive per se.

Admittedly, there has been overzealous enforcement of regulations. But a society cannot grow more productive without controlling hazards to the health of its people and natural environment, or without providing adequate opportunities for employment.

Japanese and German industries comply with U.S. product safety regulations and with their own regulations of human and environmental health that are just as stringent as those of the U.S. Their productivity and market shares for automobiles, steel, and consumer electronic equipment have grown much faster than those of U.S. firms. Louis Harris surveys indicate that a vast majority of Americans favor strong government regulations of worker health and safety, pollution and fair employment opportunities.

Fantasy: U.S. productivity declines because most employment has shifted from manufacturing to service industries.

Economists observe that a majority of the U.S. workforce is now employed in services of business or government. Further, they point out that productivity of service industries cannot be measured or controlled as precisely as productivity of manufacturing.

But it is neither logical nor inevitable that growth of employment in service industries should cause a decline in overall productivity. Actually, productivity of service industries has improved with the utilization of computers and electronic equipment to provide services for health, food, information construction, and maintenance of equipment. To conclude that American productivity declines because Americans live and work in a "post-industrial" era offers no basis for a remedy to restore productivity growth.

Fantasy: There has been a serious lack of funds for acquiring technology or more productive equipment.

Managers have complained that high inflation and interest rates have caused a shortage of capital needed for long-term investments in R&D or in more productive equipment. Managers have also complained that investors demand short-term profitability growth more than long-term productivity growth.

However, productivity stagnation is much more a cause than an effect of high inflation or interest rates. U.S. firms sustained their profitability growth-rates throughout the 1970's, while their productivity declined. Equity funds have been sufficient to finance improvements in capital equipment. Emphasis on short-term profits and neglect of long-term investments stems as much from managers' decisions as from shareholders' actions. American managers have concentrated more on growth via investments in mergers and acquisitions of firms with existing technology and equipment than on growth via investments to improve technology, products and processes. The rewards of stock-options, bonuses, etc. — all based on short-term, quarterly earnings per share — are determined by managers more than by shareholders.

Reality: More democracy and less bureaucracy and hierarchy are needed in the management of American institutions.

Morale, quality of worklife and, hence, employee productivity of American organizations have declined. Both the structure and methods of American management have grown more hierarchic and technocratic. Donald Peterson, president of Ford Motor Company, said, "In Ford we have 11 layers of organization, Toyota has 5. We've got six excessive layers of management. In engines per day Ford Produces two; Toyota produces five."

Frederick W. Taylor's scientific management has had profound influences on the education of present day leaders. Technical specialists plan and control corporate operations in minute detail. Plans are based on mathematical models and computer programs which process detailed operating data into precise operating decisions. Personnel responsible for executing decisions have little or no opportunity to participate in planning their work. Policy decisions by staff at corporate headquarters have preempted operating procedures of field organizations. The morale of field personnel has declined because they must execute decisions that they had no part in making. Consequently, American corporate morale and productivity have also declined.

However, American managers are growing aware of the need to shift to more democratic operating styles and to relax bureaucratic rigidities in management. General Motors has instituted "Quality of Worklife" (QWL) programs at plants in Tarrytown, New York and Lordstown, Ohio, where morale and productivity have increased dramatically. At the Sony Corporation plant in San Diego American employees produced more television sets without quality defects than did Japanese employees in Sony factories in Japan. Unions and management are adopting cooperative and abandoning adversarial modes of collective bargaining. It will take some time to restore the trust and morale and to strengthen the democratic modes of management or self-governance essential to productivity growth.

Reality: Pentagon arms procurement and export policies hamper U.S. productivity growth.

The Pentagon's arms-industrial policies are to "buy American" exclusively and "export American" weapons aggressively, in competition with our NATO allies as often as with Soviet-bloc governments. Per capita wealth is about the same for the Western democracies, which have similar needs to our own for military security for their industrial economies. Yet, American military spending is more than 7 times the Japanese and more than 3 times the per capita defense spending of West Europeans.

Despite all the claims of the advantages of military research and development that are "spin-offs" for U.S. consumer-industrial products, the $1 billion spent or invested for better weapons is far less productive than $1 billion for better civilian products. You cannot ride a tank or a weapons carrier but you do ride subway cars, busses and automobiles to and from work. American weapons are so technologically complex that American servicemen have difficulty operating and maintaining them. American subway cars, busses and automobiles are so inferior that Americans are depending increasingly on European and Japanese manufacturers for ground transportation. Europeans and Japanese spend more to improve technology for steel making, automobiles, machine tools, while Americans spend more to improve technology of weapons. No wonder their productivity has grown more than 5 times faster than ours!

If the U.S. Government would adopt policies for cooperation (instead of competition) in funding, developing and exporting common conventional weapons, then NATO allies would have an incentive for boosting their defense spending, because their industries could export to the U.S. defense market. Burdens of Western military security could be shared more equitably. The Pentagon budget could be safely *reduced* by as much as 35 per cent! Savings could be used to reduce taxes or increase subsidies for stimulating productivity growth of U.S. consumer-industrial product manufacturers.

Productivity management and growth require more democratic, less bureaucratic or technocratic participation by all employees of our institutions. Governments should cooperate internationally so that industrial firms compete more effectively to provide sound military-industrial security. Indeed, democratically-governed, free enterprise-interdependent societies are the only guarantors of productivity growth and peaceful security.

The October 1982 Massachusetts Economic Policy Analysis (MEPA) Model Forecast

by James K. Kindahl, Roy E. Williams, and George I. Treyz*

The very high rates of unemployment experienced in 1982 are likely to continue through 1982, then fall gradually throughout 1983 and 1984. Even by the end of 1984, the rate will be hardly below 6% — still a high level. This pattern will be essentially a reflection of a gradually improving, but still sluggish, national economy. The Data Resources, Inc. forecast for the nation paints a picture of a weak recovery; national unemployment rates will fall, though full employment does not seem likely within the next two years. Massachusetts has relatively low dependence on the hardest hit of industries (autos, steel, textiles, heavy industrial equipment, contractors' equipment); its relatively heavy concentration on electronics instruments, and other "high-tech" areas has helped to spare the Commonwealth from some of the more severe problems which have hit other parts of the country, notably the industrial states of the Midwest.

Until 1982, total employment in Massachusetts had risen every year since the recession of 1974-75, rising even in 1981 (by a very small amount); the year 1982 will show the first decline since 1975. The quarterly figures, even with seasonal adjustment, show a somewhat more erratic pattern. The year 1982 thus far has been one of decline; the forecast is that the decline will be reversed around the end of 1982, and resume a slow upward growth.

Manufacturing employment in Massachusetts has been rising as a percentage of U.S. manufacturing employment since 1976; this relative gain is expected to continue through 1984, though at decreasing rates. This relative gain has occurred largely in durables when the driving forces have been the Office and Computing Machinery group (SIC 357), Electronic Components (367), and Measurement and Control Instruments (382). Within nondurables, only Synthetic Materials (282) and "Other Nondurables" (39) show substantial growth.

The older manufacturing industries — notably food processing, textiles, paper, apparel and leather — have continued their relative decline, maintaining trends that now are well over a half century old. They have shrunk from their status as dominant industries among U.S. (and world) production to relatively minor segments of U.S. employment; and in recent decades, U.S. production in these industries has shrunk relative both to world production, and to U.S. consumption. The forecast sees no reversal of these trends in the short run.

Manufacturing now accounts for only about 24% of all employment in Massachusetts — roughly the same as for the U.S. In the remaining 76%, recent history has seen slight falls in Massachusetts employment relative to the nation; no strong pattern is visible in any of its components, nor does the forecast call for anything but continuation of this stability.

The net result of all this has been a total employment

* MEPA Project staff, Department of Economics, University of Massachusetts, Amherst, MA 01003 (Tel. 413-545-0915). Support was provided by the Department of Public Welfare, the Division of Employment Security, the Department of Commerce and Development, and Massport. The U.S. forecast used was the Control forecast from Data Resources, Inc. (CONTROL082482)

in Massachusetts which has roughly paralleled the U.S. total employment. Since 1976, there has been little net change in share of employment as measured either on an establishment basis or on a household basis.

Massachusetts population has probably increased since the 1980 Census but at a slower rate than that of the U.S. as a whole. The Massachusetts population has thus continued to fall relative to total U.S. population, as it has (with only brief reversals) since 1640, so far as can be judged from available records. The labor force participation rate has continued to rise, roughly parallel with that of the U.S. The result of this combination of stable employment and labor force participation relative to the U.S., and declining relative population (and hence labor force) has led to unemployment rates which have improved relative to the U.S.

In the 1974-75 recession, Massachusetts unemployment was well above that of the nation. By 1979, the Massachusetts unemployment rate had fallen below the U.S. rate. Beginning in 1980, and continuing through 1982, both Massachusetts and U.S. rates have climbed to very high levels; yet the Massachusetts rate has continued to fall relative to U.S. figures. The forecast calls for that relative fall to continue through 1984.

Inflation in Massachusetts is predicted to proceed much like that of the U.S., with rates in the neighborhood of 6-7% per year through the next two years. Of course, much depends on federal fiscal and monetary policies, whose actual workings will be known only with time. Inflation rates can differ moderately among areas of the country; but for the most part, the existence of national markets, a national currency, and national monetary and fiscal policy, means that inflationary pressures are very similar throughout the country.

October Control Forecast

Summary Report Massachusetts Economic Policy Analysis Model (Units as Indicated)

	1982	1983	1984	1982:3	1982:4	1983:1	1983:2	1983:3
Employment — Total Nonag.*	2618	2654	2739	2599	2609	2621	2639	2666
% Change	-1.4	1.3	3.2	-3.2	1.4	1.9	2.9	4.1
Manufacturing*	636	636	653	630	627	629	633	639
% Change	-4.6	-.0	2.7	-5.7	-1.8	1.1	2.8	3.6
Non-Manufacturing*	1982	2018	2086	1970	1982	1992	2007	2028
% Change	-.3	1.8	3.4	-2.4	2.5	2.2	2.9	4.2
Unemployment Rate	8.1	7.8	6.5	8.0	8.5	8.3	8.0	7.6
Employment Rate Index**	102.6	103.0	105.4	101.7	101.8	102.1	102.6	103.4
% Change	-2.5	.4	2.3	-4.2	.7	1.1	1.9	3.1
Relative to U.S. Index**	100.2	100.2	100.6	99.7	99.9	99.9	100.1	100.4
Rate of Wage Change	6.7	6.6	6.6	5.8	8.2	6.3	5.7	7.1
Wage Index Rel. to U.S.**	92.5	92.7	92.9	92.5	92.6	92.6	92.6	92.8
Avg. Weekly Hours in Mfg.	39.8	40.2	40.3	39.8	40.0	40.1	40.2	40.2
Rate of Price Inflation	3.6	5.9	6.6	7.9	4.8	6.9	5.8	5.9
Relative to U.S. CPI**	94.2	94.1	94.4	94.0	94.1	94.1	94.1	94.1
Personal Income (mil$)	68667	74082	81169	68762	70255	71580	73009	74946
% Change	6.6	7.9	9.6	2.3	9.0	7.8	8.2	11.0
Disposable Income (mil$)	56790	61704	67537	57290	58532	59462	60589	62684
% Change	7.8	8.7	9.5	8.5	9.0	6.5	7.8	14.6
Real Per Cap. D.I. Index**	108.1	110.0	112.0	108.2	109.0	108.8	109.0	110.9
Relative to U.S.**	105.7	105.4	104.9	105.1	105.4	105.3	105.3	105.5
Rel. Business Cost Index**	95.2	95.4	95.6	95.2	95.3	95.3	95.3	95.4
Manufacturing**	94.8	95.0	95.2	94.9	94.9	94.9	94.9	95.1
Non-Manufacturing**	95.3	95.5	95.8	95.3	95.4	95.4	95.4	95.6

*Thousands of people. **Indexes equal 100 in calendar 1973.

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MASSACHUSETTS BUSINESS AND ECONOMIC REPORT

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Exports: A World of Opportunity for Small Business

Kathleen Hagan
Manager, Foreign Trade
Massachusetts Port Authority

Exports play a vital role in the New England economy. The region's economy is export oriented and enjoys a competitive advantage internationally with its high technology manufacturing base, its highly skilled labor force, and its excellent geographic access to European markets. Moreover, both the export sector and the economy of the region have been growing steadily in the past decade and at a higher rate than the national average.

In 1980, 20 percent of the nation's manufacturing output comprised exports, compared with 14 percent in 1970. However, in New England during the past decade exports have doubled, reflecting both increasing export activities by New England manufacturers and increasing growth and opportunity in major world markets. In 1980, the region's exports totalled $10 billion, representing 6.6 percent of all U.S. exports. New England exporters are typically more aggressive in their approach to exporting. In 1980, exports as a percent of sales for New England firms were twice that of the national average — 5 percent for the U.S., 10 percent for New England.

Also important to the region's export growth is the rapid expansion of professional services, many of which, such as consulting firms in business, economics, engineering and architecture, are export oriented. While accurate figures are not available on the New England service sector's contribution to current regional and national export accounts, it is clear that services will play an increasing role in international trade and investment in the 80's.

The fastest-growing element in the U.S. trade account is the export of services. During the last five years when the overall trade balance was mostly negative, the surplus in the national service trade account doubled from 1.9 billion dollars to 3.5 billion dollars. Moreover, the potential world market for services has been growing at about 15 percent per year over the past decade compared with a growth rate of 7 percent in merchandise exports. In light of New England's recognized expertise in professional services, the region is particularly ripe for expansion in this area of export.

Although the pace of the export boom has slowed somewhat this past year due to recession at home coupled with higher dollar values and recession abroad, the long range trends in New England export trade are indeed impressive. While the traditional manufacturing industries of the region such as textiles, apparel, shoes and consumer items have witnessed a downturn in product demand, the region's technologically oriented industries are more insulated from the effects of short-term fluctuations in the dollar and remain a strong element in our region's export growth.

In an effort to assure small business involvement in this export boom, Massport began four years ago, in cooperation with the Smaller Business Association of New England (SBANE) a pioneering export marketing and technical assistance program tailored to the needs of small and medium-sized firms interested in export trade.

The Small Business Export Program has been highly successful because it offers individualized service to companies unfamiliar with the subtleties of marketing and selling overseas and confused by such mechanics of exports as financing, documenting and transporting goods for sales abroad.

Working through Massport's office in Belgium, the Small Business Export Program has provided smaller companies with the resources, expertise and contacts needed to penetrate foreign markets. To date, over 60 firms have participated in ten trade missions which have resulted in $9 million in export sales. And, several hundred firms not participating in trade missions have received individualized trade assistance. While the program has represented a broad range of high quality and unique consumer and industrial products, it has enjoyed special success with products typical of the region's high technology manufacturing base — such as computers and peripheral equipment, medical supplies and equipment, and electronic components and production equipment.

Specifically, the Small Business Export Program introduces small companies to export marketing by:

—providing research and marketing assistance to determine the nature of the company's export potential;

—identifying and contacting potential customers, distributors, agents and licensee partners for a company's products;

—analyzing distribution routes and the cost of shipping to foreign markets;

—advising on foreign trade rules, regulations and business practices;

—organizing trade missions, primarily in Western Europe, where each participant has an individual itinerary of business meetings with prequalified buyers and distributors;

—providing financial loan assistance towards trade mission costs for businesses selected for participation in trade missions.

The selection of company participants in the program is based on the export potential of their products, their financial histories, their available financial and operational resources to meet increased production demands, and managements' commitment and ability to become exporters.

The Small Business Export Program is very selective. Companies are scheduled for trade missions only if it is believed that the contacts made for them overseas will result in increasing their bottom line profits. The goal of the program, simply stated, is to encourage small businesses that are not now exporting significantly to do so, not as a one-time transaction, but permanently and profitably.

During a trade mission, a minimum of 10 individual prequalified sales meetings with foreign buyers are arranged for each participating company. While each participating company is responsible for its representative's travel costs, all logistical arrangements such as hotels, flights, and car reservations are taken care of by the Authority. And the Authority provides interest-free loans for participating firms to help defray their initial trade mission expenses.

Prior to each trade mission, a day-long seminar is held for the participants to acquaint them with the various aspects of exporting. Topics include international banking, freight forwarding, insurance, European business practices, and methods of distribution such as joint ventures and licensing. Following each trade mission, Massport staff, both in Boston and Europe, provides ongoing follow-up assistance on a company-by-company basis.

Massport is especially proud of the Small Business Export Program because it was used as a model for recently enacted federal legislation that authorizes the establishment nationwide of Small Business Export Programs (SBEP) identical to Massport's. Moreover, in recognition of the Small Business Export Program's success, Massport recently received the President's "E" Award for excellence in exporting. Because of our unique experience with the SBEP, we believe that we are especially qualifed to address both the problems and opportunities facing small business exporters.

Small firms face a number of barriers to export — both real and imagined — which exacerbate their natural tendency to postpone entrance into world markets for their products. Some of these barriers are:

—lack of market information
—lack of understanding of customs regulations
—difficulty in servicing products overseas
—currency exchange problems
—confusion regarding methods of financing
—packaging problems with overseas shipments
—frustration with international communication
—difficulty in selecting channels of distribution
—hidden incentives for overseas competitors provided by their governments
—lack of in-house international expertise
—domestic market demands which deflect management energies from export development
—lack of resources to finance export development

Of the many obstacles confronting the small business newcomer to exporting, clearly the most significant is access to financing for export sales and development. Time and again, we have seen smaller firms forgo sizeable export sales because they lacked the necessary short-term financing to carry their inventory before executing a sale. We have also seen many small firms postpone entrance into high potential export markets that are ripe for their product simply because the short-term cash burden of the support costs for developing an export program was too great.

One recent exciting development in national trade policy which will enhance the availability and affordability of export financing for smaller firms is the creation of export trading companies. On October 8th President Reagan signed the Export Trading Company Act of 1982, a law that seeks to expand U.S. exports by fostering American forms of trading companies. Trading companies in other countries, notably Japan and West Germany, have been highly successful in providing export services such as marketing, financing, transportation and insurance through a convenient one-stop vehicle. Essentially, this legislation will allow U.S. banks to invest directly in export trading companies. Previously, banks in the U.S. have been prohibited from direct involvement in commerce.

Because smaller firms often lack the resources, time and expertise to develop exports, the "one-stop" service of a well-managed and fully capitalized trading company could provide many smaller firms with an efficient, effective and economical opportunity to sell abroad. The range of other services provided by a trading company also make it a vehicle ideally suited to the needs of smaller exporting firms.

Specifically, trading companies would provide valuable assistance in the following areas:

(1) *Marketing Research:* The effectiveness of a professional trading company to locate and evaluate markets and buyers for products is beyond that of even a seasoned individual exporter.

(2) *Export Mechanics:* A trading company would handle all documentation for export sales, relieving the client firm of the burden of wading through the labyrinth of U.S. and foreign trade regulations.

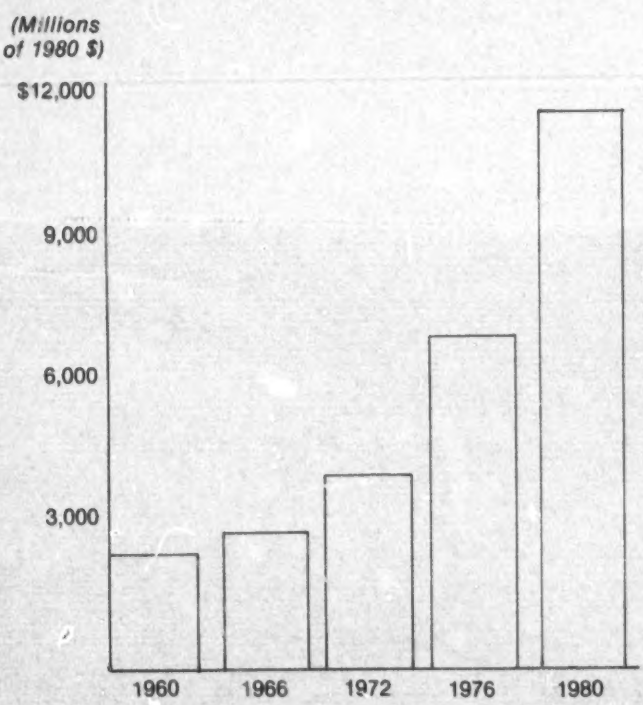
(3) *Transportation and Distribution:* A trading company would handle the often cumbersome details associated with transporting and distributing products to market.

(4) *Strategic Planning:* A trading company would bring considerable international expertise to bear on the positioning of products in foreign markets; questions involving such priorities as pricing strategies, promotional techniques and product modifications require informed judgments about the peculiarities and business practices of specific foreign markets.
(5) *Shared Financial Risk:* A trading company's financial commitment to a particular product presupposes its export potential with the trading company assuming a business risk that many smaller firms might be unwilling or unable to bear on their own.

Trading companies should not be looked upon as a panacea to this country's balance of trade problem, nor are they the only alternative for smaller exporting firms. But, the emergence of trading companies will significantly boost New England's export development by providing an infusion of capital and marketing resources into the export sector of the region's economy.

The small business community is waking up to the reality that American firms, both large and small, are competing now in a world marketplace and cannot afford *not* to think internationally. And the tremendous response by the business community to the Small Business Export Program is not just a reflection of the good efforts of Massport and SBANE, but is also a sign of the times. Indeed, Congress' strong support for the Export Trading Company Act is a clear signal that policymakers in Washington are now keenly aware that American business is beginning a new era in U.S. export trade.

MASSPORT
Growth in Manufacturing Exports from New England



School of Business Changes Name to School of Management

On ebruary 1, the School of Business Administration officially changed its name to the School of Management. The name change reflects the School's increasing efforts in public and nonprofit areas as well as its primary emphasis on private sector management. In a recent public statement, the School of Management's dean, Harry T. Allan, offered the following explanation for the change: "We are preparing people for the profession of management, which is important to and transcends business activities. It includes public management and nonprofit management, which are reflected in our program. Our mission will broaden to meet that general definition of management as we look ahead to the needs for our professional products and services in the future."

The MEPA Long Term Forecast 1982 - 2007

by James Kindahl, George Treyz and Roy Williams

I. Forecasting — Long-Term and Short-Term

An economic forecast is necessarily based on information available at the time the forecast is made. There are many interrelations in the economy which take considerable time to work themselves out; hence, forces already in motion in 1982 will have some influence on events 25 years later. A forecast is a prediction of how the economy will behave in the future if there are no further changes in factors not predicted explicitly by the forecaster — that is, if there are no wars, no shifts in international economic relations, no changes in the international oil markets, no technological changes (such as the invention and development of the electric light, the automobile, the transistor, or the computer), no migrations for noneconomic reasons, no political disturbances, no marked changes in governmental economic policy, no marked changes in weather patterns, or myriads of other events which may affect the economy significantly but which cannot be predicted.

Of course such events will occur; by their very nature, they cannot be predicted, and cannot be incorporated into a forecast. The only thing known in advance is that some such events will occur; when, where, and in what form and magnitude, is wholly unknown. This virtually guarantees that the forecast will be wrong; shocks will occur; the longer the period of the forecast, the greater

Long Term Forecast

Summary Report
Massachusetts Economic Policy Analysis Model
(Units as Indicated)

	1975	1982	1985	1995	2007
Employment—Total Nonag.*	2269	2614	2743	3006	3263
% Change	NA	2.0	1.6	.9	.7
Manufacturing*	578	629	625	653	638
% Change	NA	1.2	-.2	.4	-.2
Non-Manufacturing*	1691	1985	2118	2353	2625
% Change	NA	2.3	2.2	1.1	.9
Unemployment Rate	11.2	7.9	6.2	6.1	6.2
Employment Rate Index**	95.3	102.3	104.8	113.6	116.3
% Change	NA	1.0	.8	.8	.2
Relative to U.S. Index**	98.8	102.3	101.7	99.5	99.2
Rate of Wage Change	NA	7.2	6.2	8.0	7.0
Wage Index Rel. to U.S.**	98.3	93.7	94.5	93.4	92.8
Avg. Weekly Hours in Mfg.	39.2	39.4	40.3	40.4	40.5
Rate of Price Inflation	NA	8.0	6.1	7.2	6.3
Relative to U.S. CPI**	99.3	94.9	96.4	96.6	96.4
Personal Income (mil$)	35789	68924	87421	205329	504296
% Change	NA	9.8	8.2	8.9	7.8
Disposable Income (mil$)	30867	57443	73514	171141	418694
% Change	NA	9.3	8.6	8.8	7.7
Real Per Cap. D.I. Index**	97.8	105.3	110.9	125.3	143.0
Relative to U.S.**	100.2	104.9	102.8	101.3	101.9
Rel. Business Cost Index**	99.5	95.9	96.7	96.3	95.8
Manufacturing**	98.9	95.0	95.7	95.4	95.0
Non-Manufacturing**	99.8	96.3	97.1	96.7	96.2

*Thousands of people.
**Indexes equal 100 in calendar 1973.

the expected cumulative impact of such events.

Over a twenty-five year period, such impacts can be enormous. Consider the marked changes in the economy during the preceeding 25 year period, 1957 to 1982, or consider the fate of a 25-year forecast from 1927 to 1952, during which occurred the Great Depression, World War II, the transition to a peacetime economy, and the Korean War. Such forecasts would surely have been far off the mark; yet they might well have been accurate descriptions of the path that the economy would have taken had not those massive changes in the economy occurred.

The present forecast must be viewed with these considerations in mind. The further into the future a forecast is made, the more likely are the results to be rendered inaccurate by unforeseen events. A one-year forecast may have a reasonably high probability of predicting key figures, such as total employment or population, within (say) 2%; a 10-year forecast is substantially less likely to do so; and a 25-year forecast has little chance of doing so.

II. Two Major Sources of Uncertainty

In particular, the MEPA long-range forecast of the Massachusetts economy is affected by all of these sources of uncertainty, two of which deserve further mention. The first of these is the performance of the U.S. economy itself. Clearly, the Massachusetts economy is embedded within the U.S. economy. Events in the U.S. economy will certainly be among the main determinants, if not *the* main determinant, of the performance of the Massachusetts economy. The MEPA forecasts are based on a forecast of the U.S. economy to 2007 called TRENDLONG-2007A, which was prepared by Data Resources, Inc. of Lexington, Mass. That forecast is, of course, subject to all the uncertainities of long-term forecasts discussed in section I. The MEPA forecast of the Massachusetts economy is conditional on this forecast; hence, any errors in the U.S. forecast will be carried over into the MEPA forecast.

The second major uncertainty stems from the significant impact of human migrations to and from Massachusetts on its economy; yet, the precise determinants of these migrations are not well understood. Indeed, estimates of the sensitivity of migration between states to economic conditions in the various states vary widely. Yet, no forecast of a state's economy can be made without some assumption as to how people will make such decisions. Such decisions are far more important for long-range forecasts than for short-range ones; it is well known that migration because of economic changes typically occurs with significant time lags.

For this forecast, a very specific assumption has been made: population migrations occur so that by 2007, the unemployment rates in the U.S. and in Massachusetts will be equal. The basic idea is that, in the long run, enough workers will seek out employment opportunities by migration so that there is no reason to expect Massachusetts rates to be higher or lower than elsewhere. Whether or not this would happen (in the absence of the other, unpredictable changes which surely will occur) is not known. Hence, the necessity for some assumption about this matter is a fundamental cause of uncertainty about the forecast; a substantially different assumption would give a substantially different result.

III. The Forecast

The long term forecast provides predictions for each of 25 years (including some quarterly forecasts). Given here are just a few highlights of the forecast, primarily concerned with the broad sweep over the 25 year period.

Total Massachusetts payroll employment will rise at an annual rate of about 1% per year, or 25% over the full period. This is considerably less than the predicted growth of the U.S. economy; the share of Massachusetts in U.S. employment will decline from a 2.92% to 2.60%. Population will grow even less rapidly than employment, and also will continue to decline slightly as a percentage of U.S. population. Unemployment for 2007 is predicted (by assumption) to be the same as the U.S., 6.2% of the labor force.

Real disposable income per capita will increase by some 36% (1.2% per year) over the period, slightly less than that of the U.S. as a whole.

The shift in the composition of employment will continue its long term trend. Manufacturing employment will decline from 24.1% of Massachusetts employment to 19.6% by 2207; the number of workers employed in manufacturing will rise by only 1.4%, compared with the rise of 25% in total employment. This 1.4% rise, however, is the net result of a number of contradictory movements. Durable goods manufacturing employment will rise by nearly 18%, spurred by increases in the "high tech" industries of nonelectrical machinery, electrical equipment, and instruments; declines in lumber and furniture, primary metals, fabricated metals, and transportation equipment partially offset those increases. Nondurables manufacturing, on the other hand, shows forecasted declines in every major sector except chemicals; large percentage declines are foreseen for the leather, textile, food processing, apparel, and paper industries, continuing long-standing trends.

Nonmanufacturing employment as a whole is predicted to rise by some 32%, paced by large percentage increases in contract construction (60%), services and miscellaneous (40%), finance, insurance, and real estate (39%), and government at all levels (38%). In the nonmanufacturing area, only transportation and utilities show a decline (6%).

Inflation in Massachusetts will proceed apace with that of the U.S.; the consumer price level for Boston is predicted to be five times its 1982 level by 2007, a rate of increase very slightly more than that predicted for the U.S. as a whole. The similiarity is not unexpected. Inflation rates can differ moderately among areas of the country; but for the most part, the existence of national markets, a national currency, and a national monetary and fiscal policy means that inflationary pressures are very similar throughout the country.

The January 1983 Massachusetts Economic Policy Analysis (MEPA) Model Forecast

by George Treyz and Roy Williams

The lastest available estimates of Massachusetts manufacturing employment have shown sharp drops over the last several quarters. Total manufacturing employment is now forecast to dip almost as much as it did in 1974-1975. This is partially due to the very extended delay of the expected recovery in productive equipment investment sectors, in which Massachusetts is more than proportionately represented. Although nonmanufacturing employment is holding up comparatively well at this point, the drop in manufacturing employment will be a restraining influence on the nonmanufacturing sectors.

Massachusetts has shared fully in the dramatic drop in the national inflation rate. This drop should mean that both the U.S. and Massachusetts economies may be poised for a noninflationary recovery. If it were to become too robust, the recovery would presumably be restrained by monetary policy. Therefore, a long slow upswing with a barely noticeable reduction in the unemployment rate for the next year or two is probably the best that can be expected.

The following tables show the control forecast for Massachusetts based on the latest DRI U.S. forecast. The Massachusetts forecast shows increasing total unemployment starting in the second quarter of 1983 and increasing manufacturing employment starting in the fourth quarter of 1983. The unemployment rate peaks in the second quarter of 1983 at 8.3% (with large variation in the monthly reported estimates to be expected). The Massachusetts unemployment rate then drops slowly to a rate of 6.7% by the end of 1984. Rather surprisingly, real per capita disposable income has grown at about two percent per year despite the lackluster economy. This is the joint result of good inflation performance and tax cuts that offset the poor employment showing. We expect this income growth to continue at about the same rate.

January Control Forecast

Summary Report
Massachusetts Economic Policy Analysis Model
(Units as Indicated)

	1982	1983	1984	1983:1	1983:2	1983:3	1984:4	1984:1
Employment — Total Nonag.*	2614	2609	2673	2596	2600	2611	2627	2645
Change	-1.5	-.2	2.5	-1.3	.6	1.8	2.5	2.7
Manufacturing*	629	597	609	600	596	595	598	602
Change	-5.6	-5.1	2.0	-5.8	-2.9	-.3	1.8	2.9
Non-Manufacturing*	1985	2012	2064	1996	2004	2016	2030	2043
Change	-.1	1.4	2.6	.1	1.7	2.4	2.7	2.7
Unemployment Rate	7.9	8.1	7.2	8.2	8.3	8.1	7.9	7.7
Employment Rate Index**	102.3	101.1	102.9	100.9	100.9	101.2	101.6	102.1
Change	-2.7	-1.1	1.7	-2.2	-.1	1.0	1.8	2.0
Relative to U.S. Index**	102.3	102.5	102.1	102.6	102.5	102.4	102.3	102.3
Rate of Wage Change	7.7	6.4	6.3	6.0	7.3	7.4	6.8	5.6
Wage Index Rel. to U.S.**	93.7	94.0	94.3	93.9	94.0	94.0	94.1	94.3
Avg. Weekly Hours in Mfg.	39.4	39.7	40.2	39.5	39.7	39.8	40.0	40.1
Rate of Price Inflation	4.2	6.2	6.0	5.6	5.4	5.6	5.9	7.0
Relative to U.S. CPI**	94.9	95.8	96.2	95.8	95.8	95.8	95.9	96.0
Personal Income (mil$)	68924	73894	80634	71575	72904	74567	76531	77993
Change	7.3	7.2	9.1	6.6	7.6	9.4	11.0	7.9
Disposable Income (mil$)	57443	62047	67894	59858	61005	62827	64497	65812
Change	8.0	8.0	9.4	6.5	7.9	12.5	11.1	8.4
Real Per Cap. D.I. Index**	105.3	106.5	109.2	105.1	105.5	107.1	108.2	108.4
Relative to U.S.**	104.9	104.1	103.6	104.2	104.2	104.1	103.9	103.8
Rel. Business Cost Index**	95.9	96.4	96.6	96.4	96.4	96.5	96.5	96.6
Manufacturing**	95.0	95.5	95.7	95.5	95.5	95.6	95.6	95.7
Non-Manufacturing**	96.3	96.9	97.1	96.8	96.8	96.9	97.0	97.0

*Thousands of people.
**Indexes equal 100 in calendar 1973.

Massachusetts Business and Economic Report

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MASSACHUSETTS BUSINESS AND ECONOMIC REPORT

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New England: A Region Working at Change

Eric Swider, President and
Dianne Caughey, Economist
The New England Council, Inc.

The New England Council

The New England Council offers its 1,200 member firms direct involvement in regional and national issues affecting the New England economy. In its promotion of creative private enterprise solutions to regional problems, the Council focuses on such priorities as the cost of living and of doing business, and on issues involving energy, taxation, the environment, transportation, education, and high technology. For further information about its activities, contact the New England Council at 120 Boyleston St., Boston, MA 02116. Telephone: 617 542-2580.

New England's economic structure has changed significantly over the past three decades, with a shift away from its traditional manufacturing base to the provision of services, finance, education and production of high technology items.

Within manufacturing, employment in the nondurable "soft goods" sector, including textiles, leather and apparel, has fallen 33.3% over the past thirty years, while employment in durables, such as electrical machinery, instruments and transportation equipment has risen by more than 50%. New England continues to have a greater proportion of its labor force engaged in manufacturing than the nation as a whole, due in large part, to the continued rapid growth of high technology industries in the region.

As defined by the Massachusetts Division of Employment Security, high technology industries are characterized by a high degree of scientific and engineering input, a high ratio of research and development to sales, high growth rates, and world-wide markets. New England industries currently fitting this description include products of the durable sector, such as business machines, electric and electronic equipment such as computers, measuring and analytic instruments, defense and space products, and pharmaceuticals. Many of these products did not exist twenty years ago, yet at least 1/3 of Massachusetts, New Hampshire and Vermont manufacturing employment is now concentrated in high tech areas. Among the ten largest industrial states, Massachusetts ranks number one in the proportion of its manufacturing work force in high tech industries.

New England's High Tech Employment

	1975		1980	
State	Number in High Tech	% of Total Manufacturing Employment	Number in High Tech	% of Total Manufacturing Employment
Connecticut	80,000	20.5%	98,600	22.4%
Maine	6,100	6.4%	10,900	9.6%
Massachusetts	167,600	29.0%	235,000	34.8%
New Hampshire	20,400	23.9%	39,000	33.4%
Rhode Island	16,000	13.9%	20,200	15.6%
Vermont	11,000	27.5%	16,300	32.0%

Source: Massachusetts Division of Employment Security

The concentrated growth in services, especially the finance, education and professional areas, has provided important support to the region's manufacturing base. Indeed, two out of every three New England workers are now employed in the service-producing sector of the economy. From 1975 to 1981, the number of individuals employed in the medical, business and education sectors jumped by one-third, while finance, insurance and real estate together added over 65,000 jobs over the same time period. These service producing industries and a technologically based manufacturing sector have successfully pooled the region's scientific, financial and information expertise to form a dynamic and resilient regional economy.

New England's Manufacturing Vs. Services Employment

Year	% of Total Nonagricultural Employment in Manufacturing	% of Total Nonagricultural Employment in Services
1950	51.3%	48.7%
1960	45.6%	54.4%
1970	37.6%	62.4%
1979	32.7%	67.3%
1980	32.0%	68.0%
1981	31.6%	68.4%

Source: Department of Labor, New England Regional Office of the Bureau of Labor Statistics.

Forces Shaping the Economy

Contemporary New England still reflects the development of its early commerce centers—a settlement pattern of compact, close-spaced cities and rural hinterlands. In 1980 Rhode Island, Massachusetts and Connecticut ranked second, third and fourth respectively in population density per square mile, while more than 73% of New England's land mass remains covered by forest and woodland.

Lacking basic resources such as metals, oil, coal and fertile farmland, the region's economy is dependent upon a highly developed transportation/energy network to import its energy resources and components for industrial production and service industries. In 1980, New England imported 80% of its food from other regions and nations as well as 73% of its energy in fossil fuels. In that year, the cost of fuels for electricity generation in the region was one third higher than the national average. Indeed, every 10% increase in the cost of energy drained one billion dollars out of New England. The region's aging infrastructure also slows the import/export interchange, adding to costs. Indicative of such handicaps, New England has the highest cost of living of any region in the mainland United States.

To compensate for this lack of natural resources and distance from national markets, the region's economy has produced a changing variety of export-oriented goods and services with a high value added content to offset such cost disadvantages. The industrial structure has experienced dramatic changes: from farming to textiles, then general manufacturing and finally high technology, services and trade.

Structural Change

In the 1970's New England passed through a painful period of falling income, skyrocketing energy prices and growing unemployment. Income fell from 109% of the national average in the beginning of the decade, to 101% at the end. Energy costs of 17 billion dollars in 1979 equaled 20% of the region's total annual personal income. Meanwhile, the region's traditional manufacturing base of textiles and shoes was adapting to changing technologies and new products by diverting capital resources to new, less energy-intensive high tech industries, trade and services. By 1981, the transition was largely accomplished, with a significant portion of New England's manufacturing base composed of computers, precision instruments, electronic machinery and defense items, complemented by the support of growing finance, education and trade sectors.

A by-product of this transformation in the region's economic base is a decrease in the demand for semi-skilled workers. Many of the industries in decline are those which traditionally employed the largest numbers of skilled and semi-skilled blue collar workers, while the new and expanding areas of high tech and services typically require a work force of either highly skilled professionals or individuals with minimum skill requirements. The development of this "dual" labor demand has resulted in downward pressure on wages and reduced opportunities for a sizeable position of the region's workforce.

The economic renaissance of New England was accomplished by capitalizing upon the region's distinct strengths: a superior and plentiful labor force, scientifically based education institutions, research and development, and innovative entrepreneurs. Contributing to the quality of the labor force is an education level above the national average, with greater shares of the region's population graduating from high school, attending college, and acquiring advanced degrees. Indeed, the region's education institutions award an unusually high share of college degrees granted in all disciplines nationally, including those in science, math and engineering. Although New England ranks above average in per capita income, its workers receive wages averaging 10% below those nationwide. The relatively high regional labor force participation rates, especially among women, as well as greater amounts of property income accounts for this difference. Indicative of the regional labor force's positive work attitudes, fewer workers engage in work stoppages, and these interruptions are of shorter duration than those nationwide.

New England's labor force has a significant effect upon the changing structure of the region's industrial mix. The proximity of the region's population centers provides a large, integrated pool of labor, including computer and engineering professionals, technicians and other skilled workers. Economists, John Hekman and Lynn Browne have noted New England's gain in comparative advantage as these members of the labor force move among the area's interrelated industries and as the accumulated results of research and expertise are spread from industry to industry. Nurturing this environment of research and innovation are the region's universities whose faculties not only provide scientific knowledge and training, but a sizeable share of entrepreneural talent as well.

Besides such factors as labor force availability and quality, wage levels, access to markets and raw materials, energy plays an important role in the region's industrial mix. Due to the scarcity of energy resources in New England, the economy has steadily been moving toward less energy-intensive industries.

The oil price shocks of the 1970's also intensified the need for the region to become less reliant upon external energy resources. Conservation measures were so effective that generating a dollar's worth of income in New England required 10.6% less fuel in 1980 than in 1978. However, conservation alone does not guarantee market competitiveness—these price shocks were the added impetus needed to drive New England further toward the high tech, service and trade industries which make the region less susceptible to energy price changes. As economist Henry Lee points out, New England's indus-

trial sector now accounts for only 16 percent of the region's consumption of energy, compared with the nation's 38 percent. Of particular importance to New England's competitive stance, local manufacturers use less than half the energy per dollar value added than their competitors nationwide. The relative importance of energy in New England's production process has declined so that energy costs now account for only 4 or 5 percent of the average firm's cost of production.

Future Trends

To remain competitive in the national and world marketplace, New England must continue to make the most of its resources. The quantity and quality of its labor force is a keystone to the economic health of the region, and demographic influences over the labor force are critical. The 1980 census indicated significant trends in the size and structure of New England's population. The region's population grew considerably more slowly than did that of the nation (4% and 11% respectively). The survey also showed a sharp divergence in growth rates between the northern and southern tier states. Vermont, Maine, and New Hampshire accounted for 80% of the growth in New England's population. Moreover, net migration, rather than natural increase has become the most important factor in the region's growth patterns. More than 63% of the northern tier's population increase was due to in-migration. Studies indicate a general dispersal of labor and industry from metropolitan to nonmetropolitan areas of the region.

Due to New England's historical pattern of declining birth rates, dramatic changes in the age structure of the region have become apparent. The "new worker" age group of 15-24 year olds is shrinking, while the 35-44 age group is creating a bulge in the labor force. Through the eighties, growth of the working population will slow further, while that portion of the population aged 65 and older will increase. Forecasts beyond 1990 indicate a significantly older population and labor force in New England. These trends hold serious implications for college enrollments and training, as well as for the ability of the region's labor forces to respond to a changing industrial structure and other future challenges to New England's economy.

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1983 Advanced Executive Program

The School of Management's 1983 Advanced Executive Program will take place at the University of Massachusetts' Amherst campus on September 18-23, October 6-8, October 20-22, and November 3-5. Designed for upper-level managers who seek a broadened background and understanding of general management practice, the program's fourteen days of seminars will comprise lectures, case analyses, group discussions, and interactive team exercises. Seminars will explore such topics such as financial planning and control, corporate planning and strategic policy, management support systems, competitive strategy, assessment of marketing opportunities, information systems, and political and economic issues. In addition to distinguished members of the School of Management's graduate faculty, seminar leaders and speakers will include the following specialists from the business community:

Henry Claycamp, former corporate planner, International Harvester

Rick and Jean Driscoll, Driscoll Consulting Group

Francis J. Guiliano, Chairman, CEO & President, American Pad & Paper

Thomas C. Gunn, Manager, Arthur D. Little

James Howell, Senior Vice President, First National Bank of Boston

Donald Mullineau, Senior Vice President and Chief Economist, Federal Reserve Bank, Philadelphia, PA

William Rothchild, Staff Executive, General Electric

Sidney Schoeffler, Executive Secretary, Strategic Planning Institute

Raymond Strumberger, Manager, General Electric

James Thornblade, Vice President & International Economist, First National Bank of Boston

For further information about the Advanced Executive Program, contact Jack S. Wolf, Associate Dean, School of Management, University of Massachusetts, Amherst, MA 01003. Telephone: (413) 549-4930.

Applied Research at the Massachusetts Development Research Institute

Stephen P. Coelen
Institute Director and Associate Professor of General Business and Finance

Founded during the current academic year, the Massachusetts Development Research Institute (MDRI) provides information for planning to the Commonwealth's firms and

agencies and enhances applied research at several of the University of Massachusetts' academic programs. MDRI's research into the private sector of the Massachusetts economy explains the Institute's organization through the School of Management. However, the Institute's goals and the issues with which it deals transcend those embraced by the business school alone. Accordingly, the MDRI is fully supported by the University's College of Arts and Science's Faculty of Social and Behavioral Sciences and by the College of Food and Natural Resources.

Initially, MDRI has focused its research on such subjects as population, educational enrollment, occupational supply, state taxes, economic linkages among industries, and certain natural resource developments. These research topics are organized compactly into a rational plan that will produce much needed information for individuals, firms and agencies in the Commonwealth.

The Institute's first project is the development of population estimates for the state and its counties, cities and towns. The project attempts to fill in our historical knowledge of the state's population growth and development year by year. While these base data are critical to establishing projections of future populations, the pragmatic value of estimates data is considerably more useful. The Institute was named by the governor as the technical representative for all state demographic research related to the state's participation in the Federal/State Cooperative Population Estimates Taskforce (FSCPE). Acting with the Executive Office of Communities and Development, MDRI establishes the official population estimate statistics used in many federal aid programs. While the current emphasis on "the new Federalism" has changed much of the data on federal aid, the most recent statistics indicate that $55 billion allocated among the states was based on population statistics estimates. More than 60 formulae, including revenue sharing, employed population estimates.

Before MDRI was named to do this basic work for Massachusetts, the Commonwealth had been the only state not participating in the FSCPE. Now, substate estimates of counties, cities and towns will improve. This should enhance the allocation of the state's portion of the $45 billion (of the $55 billion total) distributed nationally among substate areas on the basis of FSCPE population estimates. This and greater awareness of the program's impact on the state's financial position have important implications. During the 1970's, when Massachusetts did not participate in this population estimates program, there were only four challenges a year from Massachusetts communities over potential inaccuracies in the U.S. Bureau of Census population estimates. Unlike other states, which issued an average of forty challenges yearly, Massachusetts failed to have an advocacy position that counted local input very heavily. Through the Institute, the state will better represent the interests of localities in need of technical support.

For firms desiring strategic planning information for marketing or locational analysis, population data are also important. This fall, the Institute's implementation of a full-scale population projection system will enable the Massachusetts business community to gain maximum use of MDRI's data banks and services. For example, firms could use the system to locate marketing clusters (see the *American Demograpics*, November 1982 article on "Cluster Demographics" for business, marketing purposes). Currently, the Institute's staff is already equipped to answer many demographic questions from business.

The Institute is also presently conducting a project for the U.S. Army Corps of Engineers by acting as an archiving agent for the national set of models known as Community Impact Models. Historically, these have been used by the Corps (and others) to estimate the impacts on local growth of oil/shale development in the Western U.S. or to evaluate the consequences (also on local growth) of various deployments of the MX missile system. At the Institue, plans are underway to use these to determine what payments should be made for public service cost categories of expenditures should major new industries be located within the Commonwealth from abroad. This is important—especially when considering that potential new foreign investments are often tied to strategies of bargaining among local communities for the most propitious tax position. For example, when Nissan, the Japanese automobile manufacturer, moved into Tennessee after negotiating with both Georgia and Tennesse, the company won an exemption from local taxes with minimal payments made in lieu of taxes. The amount of such payments can be determined by defining and running an appropriate community impact model to analyze the net additional local public service cost caused by the new industry. These models analyze the likely indirect or secondary multiplier effects and their additional net costs and benefits to the public sector. Minimum charges to such new industries should be determined to ensure that no competitive harm is done to other industries in the state.

Community impact models can help analyze many other issues, such as the impacts of legalizing gambling in the state and the consequences of alternative hazardous waste management and siting schemes. MDRI's work with the Army Corps will grow into a research base that can answer pertinent questions accurately and inexpensively.

The Institute is also working on issues relating to education and training in Massachusetts. Assuming that the state's most significant resourse is its people (and their unique opportunities for training), the Institute believes that Massachusetts has led the New England region in accomplishing what other regions have not done; namely, the retooling of its labor force. In the maturing U.S. economy, it is natural that the oldest, most mature economic sectors have been replaced by other new ones on the ever-evolving economic system. This has been accomplished through the trauma of growth and decline within geographic areas as skilled and educated labor forces have migrated toward other regions. This phenomenon is relatively new, occurring massively for the first time in the sunbelt/snowbelt confrontation of the 1960's and 1970's. In Massachusetts and New England we see for the first time an area withstanding the complete occupational transition of its labor force from one occupation to another and from one skill level to another (industrial manufacturing, residual textiles production, and defense industries into high tech trades).

For Massachusetts to withstand the current and future recessions, training of its human resources must be timed to meet changing demands for skills. Training too early will saturate the market causing labor to leave the

state for areas where it is employable. Training too late may cause employers to leave in search of an appropriate labor force. The Institute will forecast the "throughput" of the educational system, monitoring choices of the young to go directly into the labor force or armed services or to enter the state's university and college system. The Institute can look at the choice of major and vocational orientation to help anticipate occupational supply. Coupling this with information from business leaders and the Massachusetts Economic Policy Analysis Model, Institute researchers might give guidance on the training of labor. This could be useful to such organizations as the Bay State Skills Corporation or the new Microelectronics Technology Center, both which need to anticipate what skills will be deficiently supplied and when an increased supply will be necessary.

The Institute's recently issued first final-draft report, an analysis of Proposition 2-1/2, is entitled *Reductions of Local Funds from Proposition 2-1/2.* Work is beginning on elaborating the Massachusetts econometric model, which will be made available at nominal cost to Massachusetts businesses. A one-day seminar on techniques of business forecasting was held on February 8th by the Institute through the University's Division of Continuing Education and with the cooperation of the University's Statistical Consulting Center. Other seminars are anticipated for the future. The Institute encourages comments and suggestions from the public for future work. Please call (413) 545-3460 or write to:

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The April 1983 Massachusetts Economic Policy Analysis (MEPA) Short-term Economic Forecast

by
George Treyz, Roy Williams and
Margaret Larson*

Employment in Massachusetts is currently projected to increase for the rest of the year with 1983 registering a slight employment increase over 1982. This forecast contrasts with our January forecast which projected a slight employment decline between 1982 and 1983. This is entirely the result of a much more optimistic U.S. forecast by Data Resource Incorporated based on lower expected oil prices and higher projected investment expenditures. Recently revised employment data for Massachusetts show that 1981 employment was 14.1 thousand higher than previously reported, and 1982 employment in Massachusetts was 8.3 thousand higher. Thus, the 1982 employment decline was slightly more severe than previously reported.

Employment levels in Massachusetts should climb for the next few years, although at a decelerating rate. The service, durable, and contract construction sectors will account for most of the employment growth. Durables employment will increase in 1984 and 1985 as U.S. investment accelerates in response to lower real interest rates, increased capacity utilization and the expanded use of investment tax incentives. However, despite the strong durable goods recovery, Massachusetts growth is expected to be less pronounced than that of the U.S. since Massachusetts has suffered a less severe recession, and thus has fewer economic setbacks from which to recover.

The Massachusetts labor force participation rate is assumed to remain higher than that of the U.S., gradually increasing in line with the increase in the U.S. rate. Since the increase in total employment is higher than the increase in the labor force, the unemployment rate is expected to decline steadily through 1985, after peaking at slightly over 8% in 1983:2. Improvement in the unemployment rate should lag behind general recovery as people who were previously "discouraged" become more optimistic about finding a job and therefore decide to rejoin the labor force.

Inflation has indeed subsided, but the near-zero figures for 1983:1 can not be expected to persist. CPI growth for Boston is forecast to rise to an annual rate of 5.5% by this autumn and to remain near that level for the next two years. Despite a deceleration in wage increases, workers and consumers should be making a comeback for at least the next three years as employment levels increase and inflation remains well below the disastrous double-digit range of the recent past. Real per capita income is expected to increase 3.7% in 1983, 2.9% in 1984, and 1.4% in 1985.

It appears that Massachusetts production costs, particularly labor costs, are stabilizing relative to the U.S. after years of relative decline. Projected modest wage gains relative to the U.S. will moderate Massachusetts employment growth. This is forecast to produce a resumption in the long historical trend of decline in the Massachusetts share of U.S. employment.

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April Control Forecast

Summary Report
Massachusetts Economic Policy Analysis Model
(Units as Indicated)

	1982	1983	1984	1983:2	1983:3	1983:4	1984:1	1984:2
Employment — Total Nonag.*	2622	2631	2693	2621	2636	2654	2671	2686
% Change	-1.7	.4	2.3	.9	2.3	2.8	2.6	2.2
Manufacturing*	637	609	621	606	608	612	616	620
% Change	-4.9	-4.4	2.1	-1.3	1.3	2.7	2.7	2.4
Non-Manufacturing*	1985	2023	2071	2015	2028	2042	2055	2066
% Change	-.7	1.9	2.4	1.5	2.6	2.8	2.6	2.1
Unemployment Rate	7.9	7.9	7.2	8.2	8.0	7.7	7.5	7.3
Employment Rate Index**	103.0	102.5	104.3	102.2	102.6	103.1	103.6	104.1
% Change	-2.5	-.4	1.7	.1	1.6	2.1	1.9	1.6
Relative to U.S. Index**	103.1	103.8	103.3	103.8	103.7	103.7	103.6	103.4
Rate of Wage Change	8.6	6.6	6.1	6.5	7.2	7.3	5.4	5.7
Wage Index Rel. to U.S.**	94.2	95.0	95.3	94.9	95.0	95.1	95.2	95.3
Avg. Weekly Hours in Mfg.	39.4	39.7	40.2	39.6	39.8	40.0	40.1	40.2
Rate of Price Inflation	4.2	4.2	5.5	4.3	5.5	5.4	6.0	5.6
Relative to U.S. CPI**	94.9	95.9	96.3	95.9	95.9	96.0	96.2	96.3
Personal Income (mil$)	69389	74592	81206	73644	75255	77039	78908	80416
% Change	8.0	7.5	8.9	6.9	9.0	9.8	10.1	7.9
Disposable Income (mil$)	57848	62721	68401	61757	63458	65013	66624	67809
% Change	8.8	8.4	9.1	7.5	11.5	10.2	10.3	7.3
Real Per Cap. D.I. Index**	106.6	110.6	113.7	109.8	111.1	112.3	113.2	113.6
Relative to U.S.**	106.1	107.1	106.4	107.2	107.1	107.0	106.8	106.4
Rel. Business Cost Index**	96.1	96.9	97.2	96.9	97.0	97.1	97.2	97.2
Manufacturing**	95.1	96.0	96.3	96.0	96.1	96.1	96.2	96.2
Non-Manufacturing**	96.5	97.4	97.6	97.3	97.4	97.5	97.6	97.6

*Thousands of people.
**Indexes equal 100 in calendar 1973.

Massachusetts Business and Economic Report

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